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## Inpatient Mobility Measures as Useful Predictors of Discharge Destination in Hospitalized Older Adults

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### To the Editor

Post-acute care skilled nursing facility (SNF) stays are frequent and costly for the more than 13.6 million older adults who are discharged annually from nonfederal U.S. hospitals [1–3]. A key determinant of the need for post-acute care in a SNF setting is a patient's functional ability [4]. Mobility status, a distinct aspect of functional ability, may be particularly useful in identifying hospitalized older adults likely to need post-hospital SNF care. Patient mobility can be measured through observed performance-based or patient-reported measures [5–8]. Lacking from the literature is knowledge of which mobility measures in the inpatient setting are predictive of important hospital outcomes. The specific aim of this study was to determine whether performance-based and patient-reported measures of mobility could distinguish patients discharged to a SNF from those discharged home.

### Methods

This study is a secondary analysis of a clinical dataset that consisted of 349 community-dwelling hospitalized Veterans aged 60 or older, admitted to general medicine services at an academic Veterans Affairs (VA) medical center, and referred to STRIDE, a supervised

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walking program [9], between 2/1/2012 and 9/30/2013 with a baseline assessment completed. All data were abstracted from the electronic health records of the VA Computerized Patient Record System. The primary outcome assessed was discharge destination, defined as being discharged to either a home/private residence or to a SNF (i.e. community skilled nursing facility, a VA nursing home (Community Living Center), or other skilled care facility). Performance-based measures of mobility, which were obtained by a trained Physical Therapist, included: gait speed (4 categories, meters/second), 2 minute walk test (2MWT) (meters), and the balance subscale of the Tinetti Performance Oriented Mobility Assessment (POMA) (score range 0 – 16) [7]. Patient- reported mobility indices included any report of: difficulty walking across a room without help from another person or equipment (none/a little versus some/a lot/unable), difficulty walking 2–3 blocks without help from another person or equipment (none/a little versus some/a lot/unable), and use of assistive device (yes/no). Logistic regression analyses were performed to examine associations between mobility measures and the outcome discharge to SNF. All analyses were performed using SAS Version 9.3 (SAS Institute, Cary, NC).

## Results

Characteristics of the study sample (N=349) and bivariate analyses are presented in Table 1. Those discharged to SNF after hospitalization (15%, n= 53) were more likely to have slower gait speeds, shorter 2 MWT distances, and lower balance subscale scores, compared to those discharged to home. Patients in this group were also more likely to report difficulty walking across a room and use of an assistive device (Table 1). After controlling for age and race, the adjusted odds of being discharged to a SNF were greater for patients with slower gait speed (OR=1.62 per one category slower gait speed; 95% confidence interval (CI) 1.22, 2.15;  $p < 0.001$ ) poorer balance (OR=1.20 per 1 point lower balance subscale score; 95% CI 1.10, 1.30;  $p = < 0.001$ ) and shorter 2 minute walk distance (OR= 1.01 per meter; 95% CI 1.00,1.01;  $p = < 0.01$ ) In the latter case, every 1 meter decrease in the 2 MWT was associated with a 1% increase in odds of discharge to SNF. Those reporting the use of an assistive device had a 2.6 increased odds (95 % CI 1.31, 5.17;  $p < 0.01$ ) and those reporting difficulty walking across a room had a 2.4 increased odds (1.19, 5.04;  $p = 0.02$ ) of being discharged to a SNF (Table 1).

## Discussion

Among community dwelling hospitalized older adults who were ambulatory at baseline, inpatient mobility, a discrete aspect of functional status, predicted discharge destination. This study contributes to the nascent literature on the clinical utility of inpatient mobility measures in key ways. First, our findings suggest that both performance-based and patient-reported mobility measures may identify patients likely to be discharged to a SNF. Identifying those at risk for being discharged to SNF could be of tremendous value to health systems and hospital providers who are interested in conserving limited hospital resources (i.e. physical therapy or care transitions teams) for those who need them most. Second, our findings support that easily attainable and recordable patient-reported indices of mobility are feasible to collect during the course of clinical care. These data can also serve as a

springboard for future studies, including a more comprehensive look at the predictive ability of other mobility performance measures and functional trajectories during hospitalization.

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## Appendix

### Conflicts Of Interest

Elements of Financial/Personal Conflicts	J Pavon		R Sloane		M Morey		S N Hastings	
	Yes	No	Yes	No	Yes	No	Yes	No
Employment or Affiliation		X		X		X		X
Grants/Funds		X		X		X		X
Honoraria		X		X		X		X
Speaker Forum		X		X		X		X
Consultant		X		X		X		X
Stocks		X		X		X		X
Royalties		X		X		X		X
Expert Testimony		X		X		X		X
Board Member		X		X		X		X
Patents		X		X		X		X
Personal Relationship		X		X		X		X

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Characteristics of Total Sample and Performance-Based and Patient-Reported Mobility Measures as Predictors of Discharge Destination.

Table 1

Sample Characteristics	Total sample N = 349	Discharge to home n = 296 mean (SD), or n (%)	Discharge to SNF n = 53 mean (SD), or n (%)	P value <sup>e</sup>	Adjusted Odds Ratio (95% CI) <sup>d</sup>	P value
<b>Demographics</b>						
Age, mean years (SD)	73.5 (9.6)					
Men, n (%)	342 (98)					
Caucasian, n (%)	216 (62)					
<b>Mobility Measures</b>						
Gait speed, m/s, mean (SD) <sup>a</sup>	0.45 (0.3)					
< 0.2 m/s, n (%) <sup>b,c</sup>	71 (20)	53 (18%)	18 (34%)	0.001	1.62 (1.22, 2.15) <sup>e</sup>	<0.001
0.2 - 0.4 m/s, n (%)	83 (24)	65 (22%)	18 (34%)			
0.4 - 0.6 m/s, n (%)	82 (24)	72 (24%)	10 (19%)			
0.6 + m/s, n(%)	113 (32)	106(36%)	7 (13%)			
2 MWT, meters, mean (SD)	54.5 (34)	62.9 (31)	46.5 (26)	0.001	1.01 (1.00, 1.01)	<0.01
POMA balance score, mean (SD)	11 (4.0)	11.5 (3.6)	8.4 (3.5)	<0.001	1.20 (1.10, 1.30)	<0.001
Assistive device use, n (%)	181 (53)	143 (48%)	38 (74%)	<0.001	2.60 (1.30, 5.17)	0.02
Difficulty walking 2-3 blocks, n (%)	234 (68)	173 (59%)	36 (69%)	0.17	1.53 (0.80, 2.93)	.19
Difficulty walking room, n (%)	80 (23)	40 (14%)	14 (27%)	0.01	2.44 (1.18, 5.03)	<0.01
<b>Hospital Characteristics</b>						
Length of Stay, mean days (SD)	8 (8.7)					
Readmissions or death, n (%)	74 (21)					
Discharged to SNF	53 (15)					

2 MWT = 2 minute walk test, POMA = Performance Oriented Mobility Assessment, SNF = skilled nursing facility

Missing: 2MWT, n = 36 (unable to perform, and missing), POMA balance (n=17), use of assistive device (n=5), difficulty walking across room (n=6); difficulty walking 2-3 blocks (n=4).

<sup>a</sup>For the continuous measure of gait speed, the missing were excluded (n= 36).

<sup>b</sup>For better interpretability, gait speed was operationalized into the following four categories using clinically meaningful cut points derived from our sample's quartile distribution and the literature: less than 0.20 m/s, 0.20-0.40 m/s, 0.40 - 0.60 m/s, and greater than 0.60 m/s [10]. Both methods gave almost equivalent gait speed categories, which supported use of these categories. Those who did not perform the gait speed measure were grouped into the lowest category.

For the bivariate analysis, those missing or that did not perform the gait speed measure were grouped into the lowest category. For all other measures, those missing were excluded from the analysis.

$p$  Logistic regression adjusted for age and race

$OR_p$  Odds ratio for a decrease of 1 category level in gait speed.

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